

PROCEDURAL GUIDELINES FOR THE DERIVATION OF SEWAGE
TREATMENT WORKS EFFLUENT REQUIREMENTS AND FOR THE INCORPORATION OF
EFFLUENT REQUIREMENTS INTO CERTIFICATES OF APPROVAL 13615
FOR NEW OR EXPANDED SEWAGE TREATMENT WORKS

1.0 GENERAL

These Guidelines provide information on Regional and Branch activities, responsibilities and procedures to be followed to incorporate effluent requirements into Certificates of Approval for sewage treatment works.

The requirement to include effluent parameter concentrations and loadings in Certificates of Approval for proposed sewage treatment works is outlined in Policy 3 - Effluent Requirements in the publication "Water Management, Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment". The legislative authority to issue Certificates of Approval with conditions is contained in Section 24 of the Ontario Water Resources Act. Conditional approval certificates must be accompanied by a listing of the reasons for the imposition of conditions and an outline of the appeal procedures should the applicant choose to appeal the conditions.

2.0 ADMINISTRATION

The administrative arrangements and areas of responsibility for incorporation of effluent requirements into Certificates of Approval are shown in Figure I.

The development of, or the approval of, the effluent requirements determined through water assessment studies will be the responsibility of the Regions. Where there is to be some relaxation in the selection of effluent requirements from the established Effluent Guidelines (Table 1, "Guidelines For The Determination of Treatment Requirements For Municipal and Private Sewage Treatment Works Discharging to Surface Waters") for sewage treatment processes for non-restrictive receivers, the recommendation on the effluent requirements to be incorporated into the Certificate will be made and justified by the Regions. These relaxations must have the concurrence of the Director of Water Resources Branch.

The Regional Director's recommendations with respect to effluent requirements will be routed to the Environmental Approvals and Project Engineering Branch for all applications.

REGIONS

TECHNICAL SUPPORT

- water assessment studies
- establishes critical effluent quality parameters and loading limits
- reviews need for special effluent sampling and analysis requirements

MUNICIPAL & PRIVATE ABATEMENT

- reviews critical effluent quality parameters and Effluent Guidelines
- recommends treatment process & effluent requirements for C. of A.
- recommends effluent sampling and analysis requirements
- provides reasons for conditions in C. of A.

REGIONAL DIRECTOR

- reviews recommended treatment process & effluent requirements
- advises approving authority of effluent requirements and sampling and analysis requirements to include in C. of A. and what reasons to use for conditions.

HEAD OFFICE BRANCHES

WATER RESOURCES BRANCH

- oversee program implementation
- audit plant performance as to compliance with effluent requirements in C. of A.
- *provide policy and technical advice on treatment processes, effluent requirements, sampling and analysis
- *review cases of deviation and relaxation from policies and guidelines on treatment works
- when requested by Regions, or other Head Office Branches, provides technical advice on water assessment studies
- provides guidelines on assimilation studies to ensure consistency in approach
- provides Water Management Policy Interpretations

ENVIRONMENTAL APPROVALS & PROJECT ENGINEERING BR.

- reviews application and requests changes in design if necessary
- recommends application for approval with necessary conditions and reasons
- director approves application with conditions

Approval
Certificate
issued with
conditions on
effluent require-
ments, sampling
analysis require-
ments, and reasons
for conditions

FIGURE 1

* These functions will be performed in conjunction with Wastewater Treatment Section, Laboratory Services and Applied Research Branch.

If necessary, discussions regarding the effluent requirements may take place between the Regions and the Environmental Approvals and Project Engineering Branch. The Water Resources Branch may also be consulted for policy and technical advice, when necessary.

Water Resources Branch will have the responsibility of auditing plant compliance. Effluent requirements will be entered into the Management Information System - TUMMIS Computer File, along with the analytical results from the Ministry's enforcement sampling programs.* This TUMMIS File will allow automatic assessment of a plant's compliance with the specified effluent requirements, as well as the recording of the planned remedial measures for plants out of compliance.

The major activities of the program and the lead Ministry group(s) having the overall responsibility for each activity will be as follows:

- a) Oversee and expedite the implementation of the program - Water Resources Branch;
- b) Establish effluent levels and special effluent sampling and analysis requirements - Regions;
- c) Deal with all special and borderline cases - Regions, Environmental Approvals and Project Engineering and Water Resources Branches;
- d) Make necessary decisions regarding relaxation of effluent requirements for normal level of treatment - Regions and Water Resources Branch;
- e) Issue Certificates of Approval with necessary conditions and reasons for conditions - Environmental Approvals and Project Engineering Branch;
- f) Provide co-ordination role in the case of appeals to effluent requirements of C. of A.'s - Legal Services Branch;

*Refer to Policy No. 08-06: "Policy to Govern Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only)".

- g) For audit purposes, keep track of all records using the TUMMIS file - Water Resources Branch;
- h) Propose action plans for plants out of compliance - Regions;
- i) Provide periodic review and prepare status reports on the progress of the program to the Water Management Steering Committee and Senior Management of the Ministry - Water Resources Branch;
- j) Where necessary and based on experience gained during implementation as well as study results (e.g. hazardous substance identification and removal in sewage treatment works studies, etc.), modify and refine the procedural guidelines, including specifications of additional parameters - Water Resources, Environmental Approvals and Project Engineering, Laboratory Services and Applied Research Branches and the Regions.

3.0 DETERMINATION OF EFFLUENT PARAMETERS AND NUMBERS TO BE USED IN CERTIFICATES OF APPROVAL

(New Facilities, Expansions, Modifications)

Both effluent loading and effluent concentration numbers are to be incorporated into Certificates of Approval for new, expansions to, or modifications to sewage treatment works. In special cases, such as fill-and-draw lagoons, other requirements such as acceptable time and rate of effluent discharge may also be stipulated as deemed necessary.

For any particular effluent parameter, the most stringent of the effluent concentrations derived from either water assessment studies, or Effluent Guidelines as given in Table 1 of "Guidelines For the Determination Of Treatment Requirements For Municipal and Private Sewage Treatment Works Discharging to Surface Waters" or effluent requirements of other MOE Policies (e.g. phosphorus removal) will normally be incorporated into Certificates of Approval. The effluent loading will be derived based on the above effluent concentration multiplied by the design average daily flow. For fill-and-draw lagoons, length of discharge period will be required.

The effluent parameters which should be documented in the Certificates of Approval will be those parameters identified by water assessment studies, Effluent Guidelines, and Ministry policies. For instance, if a water assessment study finds ammonia concentrations to be critical and, in addition, Ministry policy requires phosphorus removal, then ammonia and phosphorus

along with the Effluent Guidelines BOD₅ and suspended solids effluent loading and concentration numbers should go into the Certificate of Approval. In certain circumstances, one or more effluent parameter requirements will be controlling. For instance, in the above example, if the phosphorus effluent requirement were set at 0.3 mg/L, only the ammonia and phosphorus loading and concentration numbers would have to be specified. Experience has shown that the Effluent Guidelines BOD₅ and suspended solids requirements will have been satisfied if the 0.3 mg/L phosphorus level is reached. Where necessary, timing constraints on effluent discharges shall also be stipulated.

For new facilities proposed for non-restrictive receivers, Effluent Guidelines BOD₅ and suspended solids effluent loading and concentration numbers should go into the Certificate of Approval. Phosphorus effluent numbers will be put in where applicable. As other policy initiatives (e.g. Disinfection Policy) are finalized, additional effluent numbers may be required.

For existing facilities on non-restrictive receivers, undergoing expansion or modification, the Region should consider basing effluent requirements upon historical plant performance. For example if a facility has consistently produced an effluent of 20 mg/L BOD₅ and suspended solids, the Region would consider requiring that this quality be maintained and not allowing degradation to the Guideline limits.

Some latitude with the selection of effluent requirement numbers will be permitted in certain special cases. Where an existing WPCP produces an effluent slightly exceeding Guideline values but the receiving water is non-restrictive, effluent requirements equal to the current effluent quality can be considered (e.g. BOD₅/S.S. of 27/27). The proponent/owner must demonstrate, in this case, that all reasonable measures have been taken to properly operate and maintain the sewerage system; and that further improvements in operation or maintenance could not result in better effluent quality; and that upgrading effluent quality to Guidelines requirements would result in an economic hardship. In no instances, however, will effluent quality requirements less stringent than those found necessary by water assessment studies be incorporated into Certificates of Approval except through Policy 2 of "Water Management, Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment".

The concurrence of the Director of Water Resources Branch must be obtained for deviations from Effluent Guidelines.

4.0 EXISTING SEWAGE TREATMENT WORKS

The above discussion deals with the procedures to be followed to incorporate effluent requirements into Certificates of Approval for new sewage treatment works or existing sewage treatment works proposed for expansion and/or modification. For existing sewage treatment works where modifications or expansions are not contemplated, some program must be developed to identify effluent requirements for these works so that there will be consistency in the required quality of effluent discharging to Provincial water bodies. The responsibility of developing this program for existing sewage treatment works will rest with the Regions in conjunction with Water Resources Branch.

Although it is not intended that approval certificates be revoked or new certificates issued for these existing sewage treatment works, it is suggested that similar procedures would be followed in setting effluent requirements for these existing works as for proposed sewage treatment works. In other words, water assessment studies of either a simple or comprehensive nature, depending upon the nature of the receiving water body, would be carried out (or repeated if the old assessment is inadequate) and effluent requirements would be developed (or updated) in accordance with the procedures discussed in Section 3.0. The Regions will identify priority and timing for the setting of effluent requirements for facilities under their jurisdictions. These effluent requirements will be recorded in the Management Information System - TUMMIS File to enable the sewage treatment works' compliance to be assessed automatically. The sampling requirements and procedures for assessment of compliance will be similar to those used for sewage treatment works with effluent requirements specified in Certificates of Approval as discussed in the following Sections.

For existing works on non-restrictive receivers, the Region should also in this instance consider basing effluent requirements upon historical plant performance in accordance with the procedures outlined in Section 3.0.

If existing sewage treatment works are found to be unable to comply with the assigned effluent requirements established during this program, Regional staff should develop upgrading schedules with the operating authorities to allow the effluent requirements to be satisfied as soon as possible.

5.0 COMPLIANCE ASSESSMENT AND ENFORCEMENT

Three modes of compliance assessment are possible: screening assessment sampling, intensive sampling and prosecution mode sampling. The application of these different modes is described in the following sections.

5.1 Effluent Sampling and Analysis For Screening Purposes

5.1.1 Incorporation of Sampling and Analysis Requirements Into Certificates of Approval

Sampling and analysis requirements, including frequency, sample locations, parameters to be analysed, period over which the sample must be composited, the number of aliquots necessary, and any other special provisions should be resolved prior to issuing a Certificate of Approval. If the routine sampling and analysis requirements outlined in Ministry Policy No. 08-06 will suffice, the requirement to follow this program shall be stated either in the Certificate's conditions, or in the covering letter. If special sampling and analysis programs are necessary, these should be developed by Regional staff, and the applicant advised of the programs' requirements preferably at the early stage of plant design and prior to the issuance of the Certificate of Approval. The requirements of any special sampling and analysis programs shall also be stated either in the Certificate's conditions, or in the covering letter.

5.1.2 Routine Sampling and Analysis Program

Ministry Policy No. 08-06 outlines the sampling and analysis requirements for municipal and private sewage treatment works. In the majority of cases, satisfaction of this Policy's routine sampling and analysis requirements together with the regular recording of flows will provide the necessary effluent quality and quantity data to assess compliance; this will be particularly the case when effluent requirements have been based upon Effluent Guidelines and Ministry policy requirements.

5.1.3 Special Sampling and Analysis Programs

When water assessment study findings necessitate more stringent effluent requirements, special sampling and analysis programs may be needed to monitor other parameters than those outlined in the routine sampling and analysis program (BOD_5 , suspended solids, total phosphorus and ammonia plus ammonium nitrogen) and may require more frequent sampling and more involved compositing procedures. As pointed out in the Ministry Policy No. 08-06, the routine sampling program includes ammonia and ammonium nitrogen primarily for statistical purposes. If the sewage treatment works is required to achieve nitrification, a special sampling and analysis program more stringent than the routine program may be necessary to adequately monitor this effluent parameter.

In order that the necessary special sampling and analysis requirements can be identified, it is suggested that the water assessment study (for plants discharging to restricted receivers) should address the sampling and flow recording requirements needed to ensure receiving water protection. Through discussions involving the Region, Environmental Approvals and Project Engineering Branch, the applicant, plus other Ministry Branches, as required, the special sampling and analysis and flow recording requirements will be determined on a case-by-case basis for each sewage treatment works application.

5.2 SCREENING FOR COMPLIANCE ASSESSMENT

The responsibility for screening sewage treatment works compliance will rest with the Ministry's Regions. Water Resources Branch, through TUMIS, will facilitate the screening process by providing automatic assessments of a plant's compliance with specific effluent requirements.

For sewage treatment works requiring only the routine sampling program, as outlined in Policy No. 08-06 and having continuous discharge with uniform effluent requirements over the whole year, screening assessments of the plant's compliance will usually be based on the running average of the previous 12-months analysis results as well as the average daily flow over the sampling period.

When special sampling programs are required due to the findings of water assessment studies, the screening assessment procedures may have to be based on other statistics than the average of the previous 12-months' analysis results. For instance, where a sewage treatment works has different seasonal effluent requirements, the performance will have to be assessed based upon sample results taken within the period of time for which the effluent quality is specified. With sensitive receiving streams, where there are concerns with toxic parameters such as hydrogen sulphide, unionized ammonia, heavy metals, chlorine, etc., screening assessments may have to use individual sample results and corresponding flow rates; thus more frequent sampling than once per month and more flow recordings may be required. The compliance assessment definitions for these special sampling programs will be worked out on a case-by-case basis by the Regions and Environmental Approvals and Project Engineering Branch. The Water Resources Branch may also be consulted, when necessary.

With the first incident of non-compliance, the Region will be notified so that they can take whatever action is deemed necessary. With the second consecutive incident of non-compliance, a warning should be issued by Regional staff to the operating authority. The third consecutive incident of non-compliance will be considered a violation requiring corrective action.

For fill-and-draw lagoon operations, sampling must be undertaken on the final day of discharge and at least once more during the discharge period. Thus, for this type of lagoon system, screening assessments will use the average of samples over the discharge period.

5.3 ACTION NEEDED WITH APPARENT NON-COMPLIANCE

Plants discharging effluents in violation (as defined in Section 5.2) of the effluent requirements, will need corrective action. Factors to consider when action is required would be: the extent of the deviation from the effluent concentration and loading requirements; the total number of effluent samples found to exceed the effluent requirement in the period of consideration; the accuracy of the analytical techniques involved; the sensitivity of the receiving stream to the parameter(s); the past history of the municipality's pollution abatement efforts; economic trade-offs; and extra waste loadings to the sewage system

unforeseen at the time of plant design. The Regions will be responsible for ensuring that action plans and schedules of compliance are developed as a result of violations. Water Resources Branch will record, update, and audit the action plans and schedules using the TUMMIS File.

In cases where the status of non-compliance is not clear cut, it is suggested that the first phase of the action plan includes an intensive sampling program of the sewage treatment works to confirm the non-compliance of the effluent requirements. This intensive sampling program should be developed by the Regions on a case-by-case basis. The details of intensive sampling programs need not be brought to the attention of the operating authority at the time of the issuance of the Certificate of Approval.

Following the confirmation of non-compliance, the operating authority should be required to appear before the Regional Director. The operating authority should be given an opportunity to explain the reasons for non-compliance with the effluent requirements and to suggest what remedial action could be undertaken. If the Regional Director is not satisfied with the explanations given or the remedial action proposed, then legal action* should be considered.

5.3.1 Prosecution Mode Sampling

If it is found necessary to enter into a prosecution mode, additional prosecution mode sampling and analyses beyond those required for screening and intensive sampling purposes, may be necessary.

For sewage treatment works having routine sampling requirements as outlined in Ministry Policy No. 08-06, the prosecution mode sampling, if required, should be in accordance with the Schedule contained in Appendix 1.

In the case of sewage treatment works having special sampling programs, the prosecution mode sampling, if required, will be developed on a case-by-case basis by the Ministry's Regions, Environmental Approvals and Project Engineering Branch, Legal Services Branch, and any other Ministry Branches, as necessary.

The applicant shall be advised of the prosecution mode sampling program which will be stipulated in the Certificate of Approval for the sewage treatment works. This can either be done by referring in the Certificate to an attached Schedule or by listing the prosecution mode sampling and analysis requirements in the Certificate of Approval itself.

* Legal action may consist of either Control Orders and/or prosecution.

POLICY NO. 08-01

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SEWAGE TREATMENT WORKS EFFLUENT REQUIREMENTS AND
FOR THE INCORPORATION OF EFFLUENT REQUIREMENTS INTO
CERTIFICATES OF APPROVAL FOR NEW OR EXPANDED SEWAGE TREATMENT WORKS:

APPENDIX 1COMPLIANCE ASSESSMENT SAMPLING SCHEDULE

This appendix outlines the sampling schedule to be followed in assessing the compliance of the effluent from sewage treatment works with the Certificate of Approval requirements. Non-compliance as determined by this schedule of sampling may lead to legal action at the discretion of the Regional Director.

TYPE OF SEWAGE
TREATMENT WORKS

COMPLIANCE ASSESSMENT
SAMPLING

A. PRIMARY TREATMENT

To be developed on a case-by-case basis.

B. SECONDARY TREATMENT, OR
EQUIVALENT

- Mechanical Plants

1. Minimum of 12 consecutive months analytical results from a minimum of one daily composite effluent sample per month taken as part of routine sampling program* by operating authority, and supplemented by spot composite sampling by MOE staff as deemed necessary.

Non-compliance with respect to effluent concentrations is considered occurring when arithmetic mean of either BOD₅, suspended solids, or phosphorus concentration exceeds the corresponding value as stated in the Certificate of Approval, or the value for previously approved works based upon MOE Policy No. 08-01, "Levels of Treatment For Municipal and Private Sewage Treatment Works Discharging to Surface Waters".

Non-compliance with respect to effluent waste loading is considered to occur when the arithmetic mean of either BOD₅, suspended solids or phosphorus concentration incorporated with the average daily flow over the sampling period exceeds the corresponding value as stated in the Certificate of Approval, or the value for previously approved works based upon MOE Policy No. 08-01.

- and/or 2. Minimum of 7 consecutive daily composite effluent samples conducted when average sewage flow rate not in excess of average flow rate experienced over the previous 12-month period, with non-compliance assessed in the same manner as in 1., above.

- Continuous Discharge Lagoons

1. Minimum of 12 consecutive months analytical results from a minimum of one daily effluent sample (either grab or composite) per month taken as part of routine sampling program* by operating authority, and supplemented by spot sampling by MOE staff as deemed necessary.

Non-compliance with respect to effluent concentrations is considered occurring when arithmetic mean of either BOD_5 , suspended solids, or phosphorus concentration exceeds the corresponding value as stated in the Certificate of Approval, or the value for previously approved works based upon MOE Policy No. 08-01, "Levels of Treatment For Municipal and Private Sewage Treatment works Discharging to Surface Waters".

Non-compliance with respect to effluent waste loadings is considered to occur when the arithmetic mean of either BOD_5 , suspended solids or phosphorus concentrations incorporated with the average daily flow over the sampling period exceeds the corresponding value as stated in the Certificate of Approval, or the value for previously approved works based upon MOE Policy No. 08-01.

- and/or 2. Minimum of one grab sample per month over at least 3 consecutive months, with non-compliance assessed in the same manner as in 1., above.

- Seasonal Retention Lagoons (Fill-and-Draw)

1. Minimum of 2 effluent samples (either grab or composite) taken during discharge period as part of routine sampling program* by operating authority, and supplemented by spot sampling program by MOE staff as deemed necessary.